UMASS/AMHERST

312066 0011 7044 0

LIBRARY
OF THE
MASSACHUSETTS
AGRICULTURAL
COLLEGE
No. 37
-20-1912
SOURCE
SB
608
C45
C4
V.1
V.1

UNIVERSITY OF MASSACHUSETTS · 1863 ·

DATE DUE			

UNIVERSITY OF MASSACHUSETTS
LIBRARY

CARD

Chestnut tree bark disease

Pamphlets v. 1

635.73
C42
v.1

For contents see items checked

on following pages.

—

LIST OF REFERENCES ON CHESTNUT TREE DISEASE.

Chester, F.D.: Blight of Japanese Chestnuts. 14th Ann. Rpt., Del., Col. Agr. Exp. Sta. 1902, pp.44-45, 1903.

Clinton,S.P.: Studies of the Chestnut Bark Disease. Conn. St. Rept., 1907-8, pt. 12, pp. 879-890, (E.S.R.,vol. 21, p. 742.)

Duggar, B.M.: Fungous Diseases of Plants. pp. 281-282. Ginn & Co., Boston,1909.

Gaskill, A.: The Chestnut Blight. 3rd Ann. Rpt., Forest Park Reservation Commission of N.J.,1907, pp. 45-46, 1908.

Hodson, E.R.: Extent and Importance of the Chestnut Bark Disease. Circ.(unnumbered) Forest Service, U.S.Dept.Agr. Oct. 21, 1908.

Massachusetts State Forester: The Chestnut Bark Disease. XXX Pamphlet, 10 pp. illus. map. 1912.

Massee, George: Diseases of Cultivated Plants and Trees. p. 210. MacMillan, London, 1910.

Collins J.

Merkel, Hermann W.: A deadly fungus on the American Chestnut. 10th Ann. Rpt., N.Y. Zoological Society, pp. 96-103, 1906.

Metcalf, Haven: Chestnut Bark Disease. Science, n.s., May 13,1910, no. 802, p. 748.

---------- Diseases of Ornamental Trees. Year book, U.S.Dept. Agr.,1907, pp. 489-490.

---------- The Immunity of the Japanese Chestnut to the bark disease. Bur. Plant. Ind., U.S.Dept. Agr., Bull 121, pp. 55-56,1908.

Metcalf, H. & Collins, J.F.: The Present Status of the Chestnut Bark Disease. U.S.Dept.Agr., Bur.Plant Ind., Bull. 141, - Part V. Including Bibliography. See also Bull. 149.

---------- :. Control of the Chestnut Bark Disease. Framers' Bulletin, 467, U.S.D.A.,1911.

Morris, Robert T.: Chestnut timber going to waste. Conservation, Vol. 15, no.4 p.226, 1909.

Murrill, William A.: A New Chestnut disease. Torreya, Vol.6, no.9, pp. 186-189, 1906.

---------- A Serious Chestnut disease. Journ. N.Y.Bot.Gard.,vol.7, no.78,pp. 143-153, 1906.

---------- Editorial paragraph in Mycologia, vol. 1, #1, p.36, 1909.

---------- Further remarks on a serious chestnut disease. Journ. N.Y. Bot. Gard., vol.7, No. 81, pp. 203-211, 1906.

---------- Spread of the Chestnut disease. Journ. N.Y.Bot.Gard, vol. 9, No. 98, pp. 23-30, 1908.

---------- The Chestnut Canker. Torreya, vol. 8, No. 5, pp. 111-112, 1908.

Pennsylvania Chestnut Tree Bark Disease Conference: Report, Harrisburg, February 20 and 21, 1912.

Pennsylvania Dept. of Forestry: Report on the Chestnut tree blight, XXX, by John Mickleborough, Pamphlet, 16 pp. illus., May, 1909.

Powell, G.H.: Notes on Chestnut Diseases. Del. Bull. 42, Dec., 1893, pp. 20, 21, fig. 1. (E.S.R., vol. 10, p. 962.)

Rehm, H.: Ascomycetes exs. Fasc. 39, #1710, Annales Mycologica, vol. 5, p. 210, 1907.

Sterling, E.A.: Are we to lose our Chestnut Forests ? Country Life in America, vol. 15, no. 1, pp. 44-45, 1908.

Williams, I.C.: The New Chestnut Bark Disease. Science, (n.s.) Vol. XXXIV, No. 874, Sept. 29, 1911.

---------- Additional Facts about the Chestnut Blight. Science, vol. (n.S.) XXXIV, No. 882, Nov. 24, 1911.

N.Y. State Mus. Bull 157. page 6-7.

LIBRARY OF THE
Massachusetts Agricultural College,
AMHERST, MASS.

THE CHESTNUT BARK DISEASE

STATE FORESTER
6 Beacon Street, Boston, Mass.

THE CHESTNUT BARK DISEASE

Where found in Massachusetts
How to tell the disease
Methods of control
Trees should be utilized before they die

STATE FORESTER
6 BEACON ST., BOSTON, MASS.

BOSTON
WRIGHT & POTTER PRINTING COMPANY, STATE PRINTERS
18 POST OFFICE SQUARE
1912

Approved by
The State Board of Publication.

THE CHESTNUT BARK DISEASE.

INTRODUCTORY.

Our Massachusetts citizens should be thoroughly alive to the very destructive disease of the chestnut trees which is threatening to say the least, if it is not indeed already present in every section of the State.

By reading this bulletin and studying the illustrations you should be able to determine whether the disease is present in your section, and to what extent.

While it had been found here and there in the State previous to this year, we were surprised to discover, upon a careful examination by experts this season, that the infestation is quite general. (See map.)

This bulletin can be secured free, for use in schools, granges, farmers' clubs or for individuals throughout the State, by addressing the State Forester, 6 Beacon Street, Boston.

ACKNOWLEDGMENT.

Acknowledgment is hereby made to Farmers' Bulletin No. 467 of the United States Department of Agriculture, from which all quoted portions of this pamphlet have been taken, and for a photograph from which Fig. 2 is reproduced.

Mr. Arthur H. Graves, M.F., of the United States Department of Agriculture, spent the summer months studying and locating the disease throughout the State. Following Mr. Graves, Mr. John Murdock, Jr., M.F., was assigned to the work, and he secured the data and photographs in this publication. Mr. Murdock was aided by various assistants on the State Forester's staff and by Mr. G. H. Allen, B.S., in particular.

F. W. RANE,
State Forester.

37673

THE DISEASE.

HISTORY AND DISTRIBUTION.

"The chestnut bark disease was first recognized as a serious disease in the vicinity of New York City in 1904. . . . Its origin is unknown, but there is some evidence that it was imported from the Orient with the Japanese chestnut. . . . It is certain that it has now spread into at least 10 States."

"So far as is now known, the bark disease is limited to the true chestnuts — that is, to the members of the genus *Castanea*. The American chestnut, the chinquapin and the cultivated varieties of the European chestnut are all readily subject to the disease. Only the Japanese and perhaps other east Asian varieties appear to have resistance. In spite of popular reports to the contrary, it can be quite positively stated that the bark disease is not now known to occur on living oaks, horse-chestnuts, beeches, hickories or the golden-leaf chinquapin (*Castanopsis chrysophylla*) of the Pacific coast."

DISTRIBUTION IN MASSACHUSETTS.

The serious character of the attack of the disease in this State was not realized until the past summer. During June, July and August Mr. A. H. Graves, representing the United States Department of Agriculture, made a tour of various portions of Massachusetts. This was supplemented by work done during the late fall by two special representatives from this office. These investigations show that the blight is very widely scattered over the State. In Berkshire, Hampden, Hampshire, Franklin and western Worcester counties the infection is general; sporadic cases have been discovered as far east as Bedford, Quincy and Taunton. The accompanying map (Fig. 4) shows all cases which have been examined closely enough to be certain that the damage was caused by the disease. In the western portion of the State each symbol commonly indicates a group of infected trees, often covering a considerable area; in the eastern portion most of the cases consist of single trees or small groups. In one locality in Alford, indicated by a special symbol on the map, all the trees

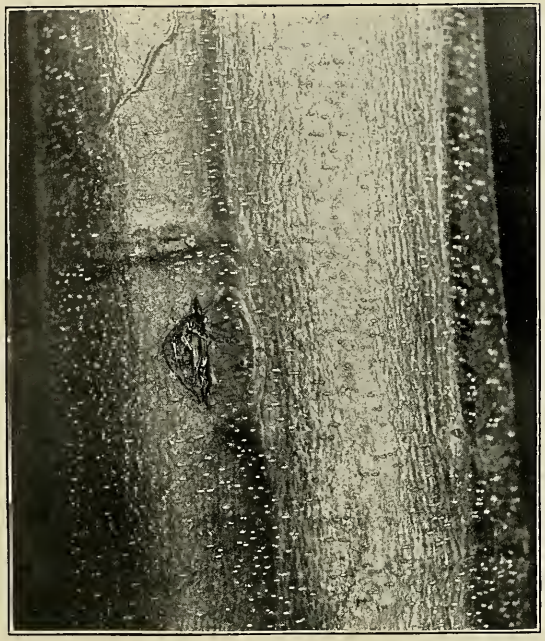

Fig. 1. — Early stage of infection on smooth-barked young tree. Specimen obtained at Barre, Mass.

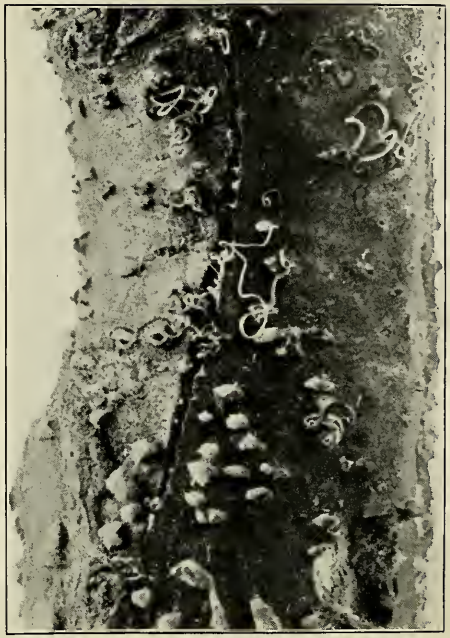

Fig. 2. — Section of infected bark, showing pustules and strings of summer spores. (Magnified.) These strings are yellowish and sticky to the touch. (Reproduced by permission of the United States Department of Agriculture.)

on an acre of pure chestnut were found dead in 1910; all the trees for some distance around are seriously infected and will die by next summer; and a heavy percentage of the chestnut is infected to a greater or less degree over an area of perhaps a square mile. No other case has been discovered in Massachusetts in which more than one or two trees in a place are dead, though there are many localities in the western part of the State in which 100 per cent. of the chestnut is infected, and will undoubtedly die within one or two years.

CAUSE AND SYMPTOMS.

"The chestnut bark disease is caused by a fungus parasite known under the technical name of *Diaporthe parasitica* Murrill. When any of the microscopic spores of this fungus gain entrance into any part of the trunk or limbs of a chestnut tree they give rise to a spreading 'sore' or lesion. . . . If the part attacked happens to be the trunk, the whole tree . . . is killed, perhaps in a single season. If the smaller branches are attacked, only those branches are killed . . . and the remainder of the tree may survive for several years."

"Some of the symptoms are quite prominent. Limbs" — or the trunks of young trees — "with smooth bark attacked by the fungus soon show dead, somewhat discolored, sunken areas (occasionally with a raised margin)" — or the outer bark may, in the earlier stages, be raised in the form of a blister — "which continue to enlarge and soon become covered more or less thickly with yellow, orange or reddish-brown spots about the size of a pinhead. These spots are the pustules of the fruiting fungus. In damp weather . . . masses of summer spores are extruded in the form of long, irregularly twisted strings or 'horns,' which are at first bright yellow to greenish yellow or even buff, becoming darker with age (Fig. 2). . . . If the lesion is on . . . thick bark . . . the pustules show in the cracks. . . . After smooth-barked limbs or trunks are girdled the fungus continues to grow extensively through the bark, sometimes covering the entire surface with reddish-brown pustules (Fig. 3). These pustules produce mostly winter spores. . . ."

"After a trunk or branch is girdled the leaves change color and sooner or later wither. Such branches have a very characteristic

appearance. . . . In case the girdling is completed late in the season, the leaves of the following spring assume a yellowish or pale appearance and do not develop to their full size. . . . The chestnut fruits (burs) on a spring-girdled branch may or may not attain full size. . . . These burs commonly persist on the tree during the following winter. . . ." The dead leaves also frequently persist through at least the first part of the winter.

"Perhaps the most easily seen as well as the longest persistent symptom of the bark disease is the prompt development of sprouts or 'suckers' on the trunk of the tree (Fig. 5) and at its base, or somewhat less frequently on the smaller branches. Sprouts may appear below every girdling lesion on a tree, and there are usually many such lesions. These sprouts are usually very luxuriant and quick growing, but rarely survive the second or third year, as they in turn are killed by the fungus. . . . Sprouts are sometimes produced as a result of other injuries, . . ." and are common following thinning of a chestnut stand as a result of the increased amount of light admitted.

MEANS OF SPREAD AND ENTRANCE.

"The disease is spread by the spores of the fungus," — minute, dust-like bodies corresponding to the seeds of higher plants, — "of which there are two kinds. . . . The spores . . . by rain . . . are washed down from twig infections to the lower parts of the tree. There is strong evidence that the spores are spread extensively by birds, especially woodpeckers," — thus causing the isolated areas of infection far ahead of the main line of advance, — "and there is also excellent evidence that they are spread by insects and by various rodents, such as squirrels. . . ." Although both kinds of spores are said to be sticky, the uniform and often rapid spread of the disease from a center of infection would seem to indicate that they are often carried to some distance by the wind. An infected area may, under favorable conditions, increase by several hundred per cent. in the course of a single season. Apparently there has been a great spread of the disease during the wet weather of the past autumn.

"When the spores have once been carried to a healthy tree, they may develop in any sort of a hole in the bark which is reasonably moist. These may be wounds or mechanical injuries, but by

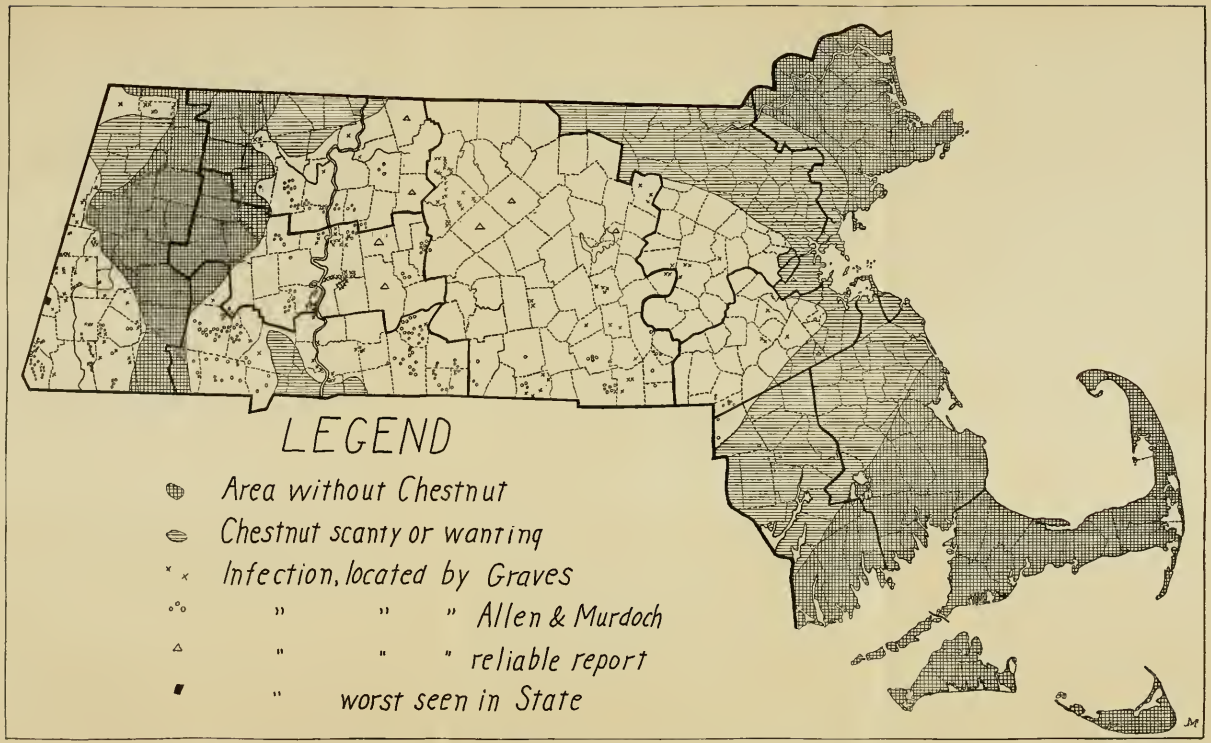
LEGEND
Area without Chestnut
Chestnut scanty or wanting
Infection, located by Graves
" " " Allen & Murdoch
" " " reliable report
" worst seen in State

FIG. 4. — Map showing the Distribution of the Disease in Massachusetts, as known Jan. 1, 1912. The Lighter Portions of the Map is where Chestnut grows naturally.

far the most common place of infection is a tunnel made by a borer. . . ."

The disease attacks only living trees, but the fungus apparently may continue to grow in the bark and to produce an abundance of spores for six months or more after the tree has died.

STATISTICS.

The following table, compiled from the best data available in this office, shows the approximate stand of chestnut, by acres, in each county and for the whole State. The areas bearing more or less chestnut in mixture with other species have been reduced to the equivalent areas of pure chestnut stand. It will be seen that approximately one-sixth of the total forest area of the State is now covered with chestnut.

It is estimated that, roughly speaking, 20 per cent. of the chestnut area bears trees large enough at the present time to be cut for ties or better classes of products. Perhaps one-half of the remainder could, if sufficiently near a market, be cut for cordwood. The balance carries young sprouts.

County.	Area (Acres).	Forest Area (Acres).	Per Cent.	Chestnut Area (Acres.)	Per Cent.
Barnstable,	263,273	140,135	53.0	No chestnut.	–
Berkshire,	630,904	330,074	54.0	81,500	25.0
Bristol,	367,642	117,193	32.0	11,000	9.0
Dukes,	71,786	23,786	33.0	No chestnut.	–
Essex,	326,660	108,537	33.0	Practically no chestnut.	–
Franklin,	441,560	224,850	50.0	24,000	11.0
Hampden,	412,934	127,890	31.0	36,000	28.0
Hampshire,	380,032	146,997	38.0	28,500	19.0
Middlesex,	657,830	182,662	28.0	19,500	17.0
Nantucket,	32,220	1,164	3.6	No chestnut.	–
Norfolk,	295,975	120,916	41.0	18,500	15.0
Plymouth,	635,363	188,937	30.0	Chestnut negligible.	–
Suffolk,	36,046	2,688	7.4	Chestnut negligible.	–
Worcester,	994,560	372,780	37.0	113,000	30.0
State,	5,321,787	1,972,950	37.7	332,000	16.8

FUTURE OF THE CHESTNUT.

USES OF CHESTNUT.

Owing to its durability in contact with the soil, chestnut is the best of all woods growing in any appreciable quantity in Massachusetts for such articles as ties, telephone poles and small bridge timbers. It is also used to a considerable extent for bridge planking. It makes a low grade of shingles, barrel staves, and boxboards. It furnishes a rather inferior quality of cordwood, but is much used at the limekilns of Berkshire County, and also has a considerable local use for fuel. It is also used in the manufacture of furniture, especially as a foundation for oak veneering.

In the southern portion of its range, where the percentage of tannin contained is the highest, and where the supply is concentrated, great quantities of chestnut are used in the production of tanning extract. No attempt has been made to establish this industry locally, and it is doubted whether the supply tributary to any one point is sufficient to justify the erection of the expensive plant necessary.

POSSIBILITY OF CHECKING THE DISEASE IN MASSACHUSETTS.

It is admitted that after the disease has once become well established in a locality there is no practicable method of eradicating it. To prevent the further spread of the blight, a "dead line" must be drawn near the main front of the advance of the disease. Behind this the chestnut must be abandoned. Outside of it, all cases of the disease must be located and the diseased trees destroyed. The survey of the State which has been made shows that, were such a line to be drawn now, not less than two-thirds of the total chestnut stand of the State, probably much more, must be left behind it. To eradicate the disease outside the line would necessitate a tree-by-tree inspection of every patch of timber containing chestnut throughout the rest of Massachusetts, since the blight has been found at or near the eastern limit of the species across the entire width of the State. The expense of such an examination would be enormous, to say nothing of the cost of removing the diseased trees when located, and of the sub-

Fig. 3.—Section of infected bark, showing pustules producing winter spores. Specimen obtained at Barre, Mass., December, 1911.

sequent re-examinations necessary to locate new infections and to make sure that none had been overlooked in the first instance. The work has not progressed far enough in Pennsylvania, where the most determined effort is being made, to show that it will be successful. In view of the comparatively small amount of timber that could be saved in any case, the great cost of the work and the uncertainty of final success, it is not believed that any State-wide attempt to check the disease is advisable. The State Forester is reluctantly compelled to predict the probability of the practical extermination of the chestnut in Massachusetts within a comparatively short term of years.

It is possible that in the case of valuable groves, especially in localities where there is not much other chestnut for some distance, vigorous local action may be able to preserve the timber. Such action is not advised unless there is a local market which will dispose of the diseased trees as they are cut.

FUTURE MARKET.

Although chestnut is a very durable wood when cut green and properly seasoned, the sapwood of dead trees left on the stump soon rots. The railroads assert that the wood of trees attacked by the disease deteriorates even before the death of the tree, in that ties cut from such trees do not hold spikes as well as do those from uninfected trees. Since the bulk of the chestnut in Massachusetts seems doomed to infection within a few years it is evident that sound chestnut timber will soon be an exceedingly scarce article in this State. Although the price of timber from infected trees will fall very low in the next year or two, as the market becomes flooded with such material, and will undoubtedly carry the price of sound material with it for a few years, it is certain that the price of sound chestnut lumber will rise again before long, and should reach figures considerably above those prevalent before the effects of the disease began to be felt in the market.

Any chestnut that is allowed to stand until killed by the disease will certainly be a dead loss. A great quantity of chestnut will probably be cut and thrown on the market when threatened with the disease, and prices will fall until they will no more than cover the cost of lumbering, leaving no margin for stumpage. But a

man who is able to cut ties, poles, etc., while his trees are still sound, and so pile them that they will keep for some years, will then have an article that will be exceedingly scarce, and that should pay a good profit on the investment. Statistics show that the average life of a chestnut tie in active service is eight years. Material carefully piled should be in good condition after at least the same period.

SUMMARY.

1. The chestnut disease is now almost universally distributed throughout the State. In the western half, infection is quite general; in the eastern half, the centers of infection are mostly small.

2. The area of severe infection is already so great, and the proportion of chestnut that there would be any hope of saving is so small, that the Commonwealth would not be justified in making any attempt to stop the disease.

3. Chestnut forms approximately one-sixth of the timber of Massachusetts. Practically all of this is almost certain to die within comparatively few years unless some unforeseen conditions come to its rescue.

4. Timber attacked by the disease soon becomes unmerchantable. Timber cut before it is infested may be seasoned and kept for many years.

5. This bulletin is not for the purpose of over-exaggeration of the chestnut disease, but is to give our citizens the exact conditions as they now appear. Let every one interested acquaint himself with his conditions by looking over the trees in his section. The illustrations will aid you.

6. The State Forester's office stands ready to examine and give advice on chestnut stands in any section of the State for traveling expenses only. The State may see its way to meet even this expense later. We desire to assist in every way possible.

Fig. 5. — An infected tree, showing the characteristic production of "suckers." Douglas, Mass., Jan. 6, 1912.

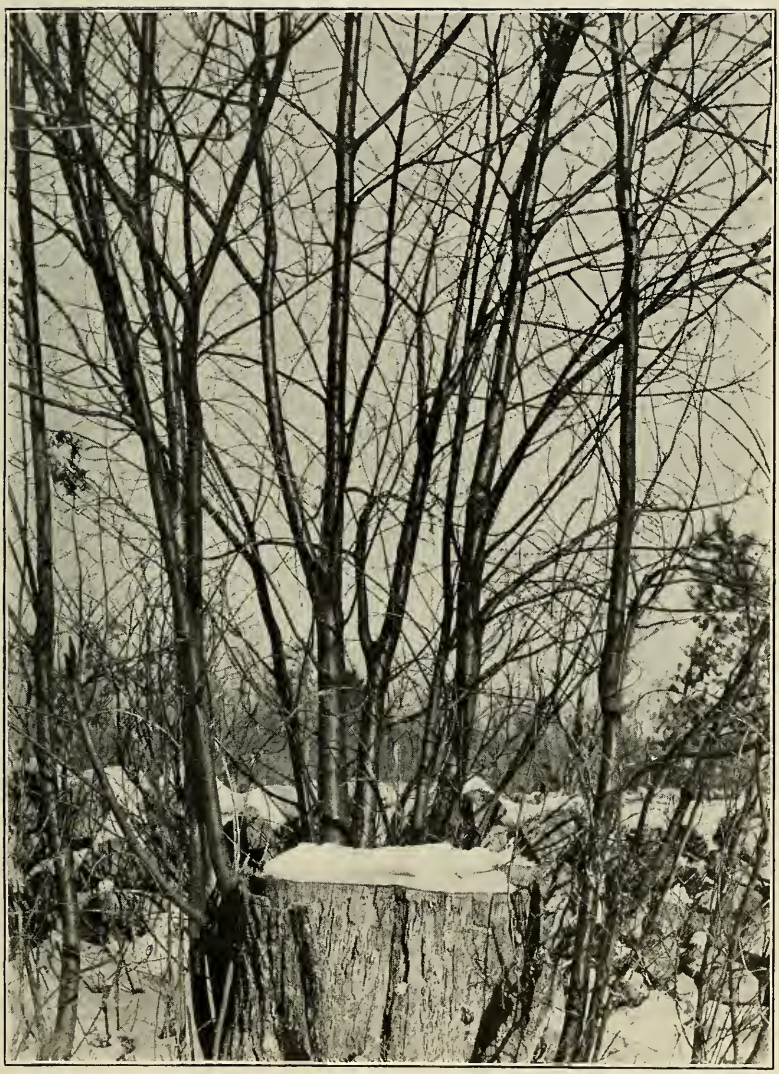

Fig. 6. — A clump of infected sprouts, showing the characteristic bushy appearance of the "suckers" on trees of this size. Douglas, Mass., Jan. 6, 1912.